

PERFORMANCE BOND COST-EFFECTIVENESS ANALYSIS

By

LORENA MYERS

A THESIS PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ENGINEERING

UNIVERSITY OF FLORIDA

2009

© 2009 Lorena Myers

To all the engineers who provided the foundation for
where we are today in the engineering field

ACKNOWLEDGMENTS

To my advisor and Supervisory Committee Chair, Dr. Fazil Najafi, who stood by me through the tough moments, your words of encouragement will forever be remembered. Thank you for directing, supporting and encouraging me. I appreciate your patience when helping me correct the many mistakes I made along my journey in the learning process. To the other member in my Committee, Dr. Mang Tia, many, many thanks to you for guidance and encouragement to keep focused on what is important and for the many ways in which you have supported me.

To Mr. Peter Kopac, for giving me insights into the world of contracts; the information was very useful because, after communicating with you, I had a clearer understanding of what I was up against.

To the DOTs, for responding to my requests and providing the contract information I needed to help get my thesis on the road. I appreciate the time you took out of your busy schedule.

To Nancy McIlrath-Glanville, for her patience, in keeping me on track during the times I was trying to figure out what was what. I appreciate your help and support.

To Will Myers for your undying support, for being my best friend who understood what I was going through when the times got tough and for always believing in me.

Finally, to those of you who helped me in small but significant ways, you provided the motivation I needed to keep on going... Thank you.

TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGMENTS.....	4
LIST OF TABLES.....	7
LIST OF FIGURES	8
ABSTRACT	9
CHAPTER	
1 INTRODUCTION.....	10
1.1 Background and Scope	10
1.2 Research Hypothesis.....	11
1.3 Research Objectives.....	11
1.4 Research Approach	12
2 LITERATURE REVIEW	14
2.1 Introduction	14
2.2 Historical Review.....	14
2.3 Current Development.....	17
2.4 Current State Practices.....	18
3 METHODOLOGY	24
3.1 Introduction	24
3.2 Data Collection.....	24
3.3 Data Organization	30
4 RESULTS, ANALYSIS AND DISCUSSION.....	34
4.1 Introduction	34
4.2 Results.....	34
4.3 Analysis	35
5 CONCLUSIONS AND RECOMMENDATIONS	43
5.1 Summary.....	43
5.2 Conclusions	43
5.3 Recommendations.....	44

APPENDIX

A CATEGORIZING PROJECTS USING SURETY BOND PREMIUMS46

B 30 STATES PRACTICES – PERFORMANCE BONDS 53

REFERENCES 63

BIOGRAPHICAL SKETCH 68

LIST OF TABLES

<u>Table</u>	<u>page</u>
2-1 State Bond Thresholds as reported by The Surety and Fidelity Association of America.....	22
3-1 Performance Bond one-time premium as reported by SFAA.	31
4-1 States’ total number of defaults and projects information for ’07–’09.....	34
4-2 States Original cost of projects, Bond Premium to Surety and total projects information for ’07 – ’09.	36
4-3 All 7 States default contractor, type of default, cost of project and approximate percent complete of project at time of default for 2007 – 2009.....	37
4-4 States total number of defaulted contractors, contractors and projects.	40
4-5 States total cost of default projects, 50% of total cost of default projects and surety cost of all projects for 2007 – 2009.....	40
4-6 States surety cost of default projects for 2007 – 2009 in relation to the total surety cost of all projects for the same time period.....	41
4-7 States default projects and cost, all projects and total cost for 2007 to 2009.....	42
4-8 States cost of default projects as a percent of total cost of projects for 2007 to 2009.....	42
A-1 States original and surety cost for all projects with corresponding price range and percent bond premium from ’07 to ’09.....	47

LIST OF FIGURES

<u>Figure</u>		<u>page</u>
2-1	State practices for prequalification for contract awards as reported by Minchin and Smith in the National Cooperative Highway Research Program (NCHRP) <i>Quality-Based Performance Rating of Contractors Prequalification and Bidding Purposes</i> (2001).....	19
3-1	The Alabama Department of Transportation letter requesting contract information September 2009.....	26
3-2	The Hawaii DOT request for information form sent September 2009.....	27
3-3	The Rhode Island DOT request for information form sent September 2009.....	29

Abstract of Thesis Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Master of Engineering

PERFORMANCE BOND COST-EFFECTIVENESS ANALYSIS

By

Lorena Myers

December 2009

Chair: Fazil Najafi
Major: Civil Engineering

A performance bond provides the assurance that an awarded construction project will be satisfactorily completed in the event that the contractor is unable to complete the projects as agreed and the contract is terminated. Passed into law in the late 1800s, performance bonds protect against financial losses.

The ability of contractors to provide performance bonds for the projects they bid on has mistakenly been assumed as a guarantee that contractors will perform well on the projects they are awarded when in fact this is not the case. With the scarcity of funding, due to the recent recession, and the awarding of contracts to contractors who continually default on projects they are awarded, indications are that there is a need to evaluate the cost-effectiveness of performance bonds. This paper takes a look at the cost-effectiveness of performance bonds on a national basis.

In order to do the analysis, state construction project data was collected for contract awards from the last two years (September 2007 to September 2009). The results of the analysis suggest that states that have a small number of defaults, or none at all, did not benefit while states that have numerous defaults benefited from having performance bonds. In conclusion, the results suggest that performance bonds were beneficial to states that experience a large number of defaults.

CHAPTER 1 INTRODUCTION

1.1 Background and Scope

Using bonds alone does not guarantee that a contractor can perform the work. Bonds protect against financial losses but cannot predict delays and public inconveniences. Research has not suggested so far that prequalification predicts delays, eliminates public inconvenience, or guarantees that contractors can perform work. The value added by a prequalification (meaning performance based) system, from the prediction standpoint, is that Departments of Transportation (DOTs) collect performance information on contractors (*I*). In order to consider switching to using performance based prequalification, it is important to evaluate the cost-effectiveness of the current practice of performance bonding.

The scope of this research is to analyze the cost-effectiveness of performance bonds through:

- Obtaining contract awards data (name of contractor, type of project, cost of project and whether the contractor defaulted on the project) from all states.
- For the states with defaulted projects, obtaining information about the percent complete of each project at the time of default.
- Obtaining performance bond premium cost for projects.
- Categorizing projects based on performance bond premium thresholds.
- Analyzing the type and range of projects experiencing the most default to see if there is any correlation.
- Calculating the possible DOTs benefits using the default information by assuming 50 percent of total defaulted projects costs is the amount the surety spends for the completion of defaulted projects.
- Finding the ratio (1) of DOTs benefit to total cost of performance bond premium to surety for defaulted projects.

- Finding the ratio (2) of total cost of all defaulted projects to the total cost of all projects.
- Analyzing ratio (2) to ratio (1) to conclude whether it is cost effective to use performance bonds.

1.2 Research Hypothesis

Performance bonds are the current practice used by all states to ensure the successful completion of projects. The goal is to eventually transition to a performance based qualification practice. To consider transitioning from performance bonds to performance based qualification, the cost effectiveness of performance bonds needs to be evaluated. As was mentioned earlier, performance bonds come into effect only after defaults occur. Based on this, the research hypothesis is: using the state projects default information, it is not cost effective to use performance bonds.

1.3 Research Objectives

The original set of objectives, for this research, came from the 2009 Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) Synthesis 390: *Performance-Based Construction Contractor Prequalification suggestions for future research on Performance Bond Cost-Effectiveness Analysis*,

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_390.pdf. These objectives are as follows:

- Quantify the cost of performance bonding on a national basis.
- Specifically look at contractor defaults rates on a state-by-state basis.
- Develop a list of contractors that have exemplary performance record.
- Develop a list of types of public transportation projects that are at most risk of default based on past records of contractor performance.
- Develop a list of types of public transportation projects that are at least risk of default based on past records of contractor performance.

- Compare the cost of performance bonding with the potential benefit of replacing performance bonding with a rigorous performance-based contractor prequalification process based on the Ontario Model.
- Develop an algorithm to adjust a good contractor's performance bonding requirements in the event the agency chooses to implement the process.

The original thesis title accompanying the above objectives was Performance-Based Contractor Prequalification as an Alternative to Performance Bonds. Although the previously mentioned objectives involved many facets, it was a starting point from where the research could have begun. In addition, according to a Federal Highway Administration (FHWA) official, "the study is estimated to cost \$275K, or a little over 1 person-year of effort, and was thus not meant for a grad student working alone". Due to the decision to consider the cost effectiveness of performance bond through evaluating defaults, the thesis title was changed to the current one. Indeed, before an evaluation can be made to consider implementing another practice it is important to know the cost-effectiveness of the current one. Also, given the duration of the research period, the original objectives were revised to the following:

- Search literature on current topic of performance bond.
- Collect contract awards data from September 2007 to September 2009 from all states.
- Obtain an estimate of surety performance bond premium cost.
- Perform an analysis of data based on defaulted and all projects.
- Quantify and analyze the benefit to cost of having performance bond for defaulted and all projects (See Table 4-6 through 4-8).
- Conclude from results and analysis whether or not the hypothesis is supported.
- Make suggestions for future research work.

1.4 Research Approach

Performance bond coverage comes into effect when the surety has proven that the contractor has indeed legally defaulted. With this in mind, the decision was made to analyze the

cost effectiveness of performance bonds using defaults since performance bonds were put in place to remedy problems associated with defaults. The following literature review chapter gives some insight into the relationship between performance bonds and defaults.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature research relevant to evaluation of the cost effectiveness of performance bonds. A library search at the University of Florida (UF) was done to find articles on the topic of the cost-effectiveness of performance bonds and is discussed in the Historical Review below. An online search yielded recent articles that consider performance bonds but do not specifically address the cost-effectiveness of performance bonds. Articles that were obtained during the online search are discussed in both the Historical Review and Current Development sections below.

2.2 Historical Review

The use of performance bonding arose in the American construction industry in the late nineteenth century in an attempt to protect public treasuries against the risk of default on public projects. Prior to the 1890s, most sureties were individuals and uncompensated, although a few corporate sureties had been organized. In response to the financial panic of 1893, the Heard Act was enacted. It required that the performance and payment obligations of federal contractors be guaranteed by surety bonds issued by “good and sufficient” sureties, including compensated corporate sureties approved by the Treasury Department (2).

Congress passed the Heard Act in 1894. Before the passage of the Heard Act, a subcontractor or supplier of a government contractor had little recourse against the government contractor, since the subcontractor or supplier could not assert a lien against property owned by the United States (U.S.) Government contracts awarded during that period only rarely had clauses requiring the prime contractor to pay its debts to subcontractors and suppliers or permitting the government to withhold payments to the contractor if it did not. The Heard Act

granted a right of action in the name of the U.S. against a prime contractor and its surety for unpaid labor and materials used in the prosecution of contract work (3). In 1905, Congress amended the Heard Act by adding the phrase “labor or materials used in construction of any public building or public work.” Noting these deficiencies, Congress repealed the Heard Act (3). In 1935, the Miller Act replaced the Heard Act (2).

The Miller Act provides as follows: bonds of contractors of public buildings or works – type of bonds required – before any contract for the construction, alteration or repair of any public building or public work of the U.S. is awarded to any person, such person shall furnish to the U.S. the following bonds, which shall become binding upon the award of the contract to such person, who is hereinafter designated as “contractor”: a performance bond with a surety or sureties satisfactory to the officer awarding such contract and in such amount as he shall deem adequate, for the protection of the U.S. In 1966, Congress amended the Miller Act to further protect the government and required that a bond issued pursuant to this legislation “specifically provide coverage for taxes imposed by the U.S. which are collected, deducted, or withheld from wages paid by the contractor in carrying out the contract with respect to which such bond is furnished (4).”

To understand how performance bonds work, it is important to look at how a bond is formulated. A performance bond is, first and foremost, a contract (2). It is a document that creates rights and obligations that are distinctly in the nature of a contract, and which in turn incorporate other rights and obligations that are also distinctly in the nature of a contract. Hence, anyone setting out to understand just what a performance bond is would be well advised to appreciate early and never forget that the law of performance bonds is contract law and that the precepts of the law of contracts universally apply. In addition, because the setting is by definition

contractual, the next step in understanding and/or analyzing a performance bond is to read it, line by line and word by word. Apart from statutory bonds, which have their own set of immutable dictates simply because they are statutory, all others are ultimately a function of what the parties agreed to, nothing more, nothing less. Within the bounds of what is lawful, all that follows (in the contract) can be varied by specified agreement (4).

Performance bonds are contracts that create a tripartite relationship. There is the “principal” (typically the general contractor) who has assumed a contractual undertaking. There is the “obligee” (typically the project owner and for the purposes of this research will be taken as the State Departments of Transportation (DOTs) that is due the benefits of the principal’s performance. And there is the “surety” who provides the performance bond that secondarily guarantees to the obligee performance of the principal’s contractual undertaking. As was mentioned above, performance bonds ensure that, although unfavorable circumstances may arise, the project will be completed. The surety would provide the resources to hire a new principal to complete the work specified, or the balance of funds allocated to remaining work would be returned to the obligee (2).

Therefore, to analyze the cost effectiveness of performance bonds, it is necessary to take a look at the number of defaults that have occurred during the analysis period. In order to do so, it is necessary to clarify what is meant by the word default. In construction surety law, to constitute a legal default, there must be a material breach or series of material breaches of such magnitude that the obligee is justified in terminating the contract. Usually the principal is unable to complete the project leaving termination of the contract as the obligee’s only option (2).

The U.S. Congress took a look at waiving performance bonds for certain projects a little over 68 years ago in the report entitled “Amending the act of April 29, 1941, to authorize the

waiving of the requirement of performance and payment bonds in connection with certain contracts entered into by the Secretary of Commerce: report, to accompany H.R. 10068 (5).” Some 47 years after passing the Heard Act, Congress evaluated whether or not performance bonds could be waived for certain contracts. The current trend, likewise, is repeating the same process of evaluating whether performance bonds can be waived for certain projects as well.

In addition, a report entitled “Better Performance Information Needed to Support Agency Contract Award Decisions,” published by the United States General Accountability Office (GAO) in April of this year 2009, mentions contractors, who have defaulted on previous projects, receiving bid awards for new projects for which they “qualify” for. This recent awarding of contracts to defaulted contractors highlights the need for information on contract terminations when making contracting decisions. For example, a \$280-million Army munitions contract was awarded to a contractor that had previously been terminated for default on several different contracts. Subsequently this same contractor defaulted under that contract. The contracting officer stated that this information, if available would have factored into the contract award decision (6).

2.3 Current Development

Looking at the current challenges facing DOTs with respect to contract awards to defaulting contractors, there is the need to consider putting checks and balances in place. With the government relying on many of the same contractors to provide goods and services across agencies, the need to share information on contractor’s past performance in making contract awards decisions is critical (6). One such is the Ontario Ministry of Transportation’s (MTO’s) performance-based contractor prequalification program. It is perhaps the most interesting example because this agency does not require performance/payment bonds or bid deposits from prequalified contractors. MTO’s program was started in the late 1950s. It not only provides an

incentive for contractors to perform well but also allows the agency to accrue a tangible monetary benefit. With an annual construction program of roughly CDN\$1.4 billion (equivalent to USD\$1.3 billion) and average Ontario performance/payment bond costs of 5% of contract cost, the estimated savings to the province is roughly \$70 million per year (equivalent to USD\$65 million per year) in bond costs (7).

The current trend is to transition from performance bonds to a performance based system, such as the one MTO has been using for over 50 years, where contractors are awarded projects based on their past work experience. Many of the performance rating systems currently in place use a questionnaire. Key elements in the current performance measurements by the DOTs are the contractor's cooperation, schedule and product. Seven states are already using an indexing system to rate or rank contractors. Those seven states are Connecticut, Maryland, Minnesota, Missouri, Utah, Virginia and Wisconsin. More comprehensive information is provided in the Transportation Research Board (TRB) report "*Quality-Based Performance Rating of Contractors for Prequalification and Bidding Purposes*"

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w38.pdf (8). The next section below takes a look at the current practices of the 30 states in this research.

2.4 Current State Practices

Four strategies that DOTs use to qualify contractors: prequalification, post-qualification, performance bonds, and contractor licensing (1). Figure 2-1 below shows current practices of 35 DOTs. Out of that 35, the 23 can be found included in this research are Alaska, Colorado, Connecticut, Delaware, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Michigan, Minnesota, Montana, New Jersey, New York, South Carolina, South Dakota, Texas, Washington, West Virginia, Wisconsin, and Wyoming.

	AK	CO	CT	DE	FL	GA	ID	IL	IN	IA	KS	KY	LA	MA	MD	ME	MI	MN	MO
PRE-QUALIFICATION	X	X	X		X	X	X	X	X	X	X	X	X	X			X		
POST-QUALIFICATION																			
LICENSE	X				X		X						X						
INCENTIVES																		X	
CYCLICAL CONTRACTOR PERF. RAT.																			X
PAST PERFORMANCE																B			
PROCESS																			
-Cooperation			D	D		D		D	D	D	D	D		D	D	B	D		D
-Equipment	C	C		D	D	B		C	B	B		B		B			D		D
-Organization & Management		C		D	D			B	B	B		B		B		B	D		D
-Schedule			B	D	D	D		D	D	D		D		D		B	D		D
-Timely Submission of Reports			D		D			D						D	D	B			D
-Safety				D		D										B			
-Job Cleanliness			D		D														
-Experience																			
-Past Projects	C	C			B	C		C	B	B	C	B		C					
-On-going Projects	C				B	C					C	C							
-Default	C	C				C		C		C	C								
-Pre-Qualification in Other States											C								
PRODUCT				D		D		D	D	D	D	D		D	D		D		D
FINANCE	C	C			C	C		C	C	C	C	C							
CURRENT INDEXING SYSTEM		M													X				

X: Yes
 M: Materials only
 C: Contractor fills out self-report
 D: DOT evaluates contractor
 B: Both

Figure 2-1. State practices for prequalification for contract awards as reported by Minchin and Smith in the National Cooperative Highway Research Program (NCHRP) *Quality-Based Performance Rating of Contractors Prequalification and Bidding Purposes* (2001).

	MT	NE	NJ	NY	NC	ND	NV	PA	SC	SD	TX	UT	VT	VA	WA	WV	WI	WY
PRE-QUALIFICATION		X	X		X	X	X	X	X		X	X	X	X	X	X	X	X
POST-QUALIFICATION				X														
LICENSE					X	X			X									
INCENTIVES																		
CYCLICAL CONTRACTOR PERF. RAT.										X								X
PAST PERFORMANCE																		
PROCESS																		
-Cooperation		D			C		D	D			D	D	D	D	D	D	D	D
-Equipment		D	C	D	C	C	D	B	C			D	D	C	B	D	B	B
-Organization & Management		B			C		D	B	C	D		D	D	D	B		D	D
-Schedule		D	D		D		D	D		D		D	D	D	D			D
-Timely Submission of Reports			D									D	D		D			D
-Safety		D					D											D
-Job Cleanliness																		D
-Experience																		
-Past Projects		C	C	C	C	C	C	B	C	D		B	C		B	C		C
-On-going Projects				B	C	C	C		C					C				C
-Default		C	C	D			C	C	C				C		C	C		C
-Pre-Qualification in Other States		C			C								C		C	C		
PRODUCT		D			B		D	D					D		D	D	D	D
FINANCE		B	C	C		C	C	C	C		C	C	C	C	C	C	C	C
CURRENT INDEXING SYSTEM					X		X					X				X	X	

X: Yes
 M: Materials only
 C: Contractor fills out self-report
 D: DOT evaluates contractor
 B: Both

Figure 2-1. Continued

Those that do not have a prequalification system are Delaware, Maine, Minnesota, Montana, New York, and South Dakota. Minnesota bases its entire transportation-building program on a system of incentives and disincentives. Colorado, likewise, does ratings based on test results. In addition to quality scores, incentive and disincentive amounts are listed for each contractor (1).

Connecticut conducts annual performance ratings of all contractors, including subcontractors, for a calendar year. Interim ratings are used to evaluate a contractor's performance on a project to date and are conducted only when requested by the Offices of Construction or Contracts. The data collected is available for decision support. West Virginia requires that contractors, through the West Virginia Contractor's Licensing Law to Support Quality Construction, have a license issued by the Secretary of State. The Division of Highways oversees a traditional prequalification procedure based primarily upon a financial questionnaire and inquiry into bonding and equipment information. They have no formal contractor's performance rating system (1).

Wisconsin rates the prime contractor and each subcontractor at the time of contract completion or, if necessary, when a subcontractor's work is completed. The primary purpose of the rating is to provide input when establishing a contractor's bidding limit. Contractor bidding limits have both increased and decreased based upon this rating (1).

Taking a look at all states, the 1996 NCHRP Synthesis 190 reports that all states require a bond or the equivalent of a bond at some stage of the qualification process (9). The Surety and Fidelity Association of America (SFAA), a trade association of 450 companies that are licensed to provide surety and fidelity bonds, also reports, in the 2009 Ohio HB 1 report, that all 50 states and the District of Columbia require surety bonds on state and local public works projects (10).

Although both reports mentioned that all states require bonds, it is important to take a look at the performance bond practices of the 30 states. Table 2-1 below shows the performance bond threshold for each state. If the contract amount is above the threshold, a performance bond is required. States that have no thresholds are Delaware, Idaho, Ohio, and West Virginia (11).

Table 2-1. State Bond Thresholds as reported by The Surety and Fidelity Association of America.

No.	State	Threshold
1	Alabama	\$50,000
2	Alaska	\$100,000
3	Arizona	\$50,000
4	Arkansas	\$20,000
5	California	\$100,000
6	Colorado	\$100,000
7	Connecticut	\$100,000
8	Delaware	No Threshold
9	Georgia	\$100,000
10	Hawaii	\$25,000
11	Idaho	No Threshold
12	Illinois	\$50,000
13	Iowa	\$25,000
14	Kansas	\$100,000
15	Maine	\$125,000
16	Michigan	\$50,000
17	Minnesota	\$75,000
18	Mississippi	\$25,000
19	Montana	\$50,000
20	New Jersey	\$100,000
21	New Mexico	\$25,000
22	New York	\$100,000
23	Ohio	No Threshold
24	South Carolina	\$50,000
25	South Dakota	\$50,000
26	Texas	\$100,000
27	Washington	\$35,000
28	West Virginia	No Threshold
29	Wisconsin	\$10,000
30	Wyoming	\$7,500

Obtained mostly from the states' standard specifications, Appendix B gives information, about states performance bond requirements. States that require 100 percent of contract amounts

are Alabama, Arizona, Arkansas, Connecticut, Delaware, Georgia, Hawaii, Illinois, Iowa, Kansas, Maine, Michigan, Minnesota, Mississippi, Montana, New Jersey, New Mexico, New York, Ohio, South Carolina, South Dakota, Texas, Washington, West Virginia, and Wyoming. Alaska requires the performance bond to be equal to the payment bond amount when it is not specified in the contract. California is at least half of the contract price. Colorado states that the performance bond penal sum equal to the nearest integral one hundred dollars in excess of the sum of the original bid items plus force account items. Idaho performance bond amount is no less than 85 percent of the contract amount. Wisconsin did not specify an amount but simply stated that the amount is on the bond form. Looking at the performance bond survey results from Synthesis 390 Conclusion 4, on pg. 56, the survey found that four states (Illinois, Iowa, Maryland and New Mexico) do not require performance bonding (7 Synthesis 390). When in the process of gathering information from the New Mexico DOT, a DOT official stated that New Mexico did require performance bond as is stated in the specification. Illinois and Iowa require performance bonding as well.

An interesting point that was brought up by a FHWA official was whether the performance bond amount is always 100 percent of the contract amount since 7 states that gave responses of yes to Synthesis 390 survey results table, question 21, on pg. 78, *has your organization ever required less than the full contract amount to be bonded (7 Synthesis 390)?* The next section discusses the methodology used to evaluate the cost-effectiveness of performance bond in this research.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter reviews how the research data was collected from the DOTs and how the data was organized for analysis.

3.2 Data Collection

The DOTs were contacted via email, phone or postal mail as shown in Figures 3-1 to Figure 3-3 below. Information was requested for all awarded public transportation construction contracts for the last two years including the name of the contractor type of project, the amount awarded for the project, and whether the contractor defaulted on the project. Some states, for example Utah, did not respond to the request. Others responded to the request but did not follow through with providing the data. There were some states that responded and provided data but not in the entirety (four parts to the information being requested).

While collecting the data, some DOTs (Arizona DOT) were generous enough to not charge for processing that type of data since the research is for academic purposes. Others (Texas and California) responded quickly and were generous with the information they provided. Some charged for processing the data based on the volume of information being requested. For some states, simply sending an email request was not sufficient. An official request by filling out a form had to be made to the DOT based on the Public Record Access Act (See Figure 3-2 and Figure 3-3).

Some states saw requesting this type of information as sensitive and were a little reluctant to release it. While others such as, Alaska, California, Colorado, Georgia, Idaho, Mississippi and New Jersey, Texas saw the information requested as public information. Colorado, Georgia, Idaho, Mississippi and New Jersey all have the contract information displayed on their website.

If a state reported that it did have defaults, an additional email was sent requesting the name of the contractor that defaulted, the type of project that was defaulted, the project amount and the percent complete the project was when default occurred. Example of emails and a letter (See Figure 3-1) sent requesting contract information is shown below.

All DOTs required that a written request for the information be made. When a Department of Transportation (DOT) was initially contacted, the following email was sent:

I am currently a graduate student here at the Civil and Coastal Engineering Department at the University of Florida. I am currently working on my thesis which is to evaluate the cost-effectiveness of performance bonds. In order to do this, I need to obtain information for all awarded public transportation construction contracts for the last two years (September 07 to September 09). The information I am seeking is the name of the contractor, type of project, the amount awarded for the project and if the contractor defaulted on the project (had the contract for the project terminated through some fault the contractor) or not. I am currently contacting all 50 DOTs to be able to do this analysis on a national level. Thank you for helping me gather information for my thesis.

If the DOT was contacted via phone before an email was obtained, the following email was sent:

As per the phone conversation earlier today, the information I am seeking is for all awarded public transportation construction contracts for the last two years (September 07 to September 09). Name of contractor, the type of project, the project amount, if the project was defaulted (had the contract for the project been terminated through some fault of the contractor) or not. If the file you are emailing is a big one, please send it to lorenagut@gmail.com because

my ufl account has a limited amount of mailbox space. Thank you for helping me gather information for my thesis.

Lorena Myers
117 NW 15th Street
Gainesville, FL 32603

September 13, 2009

Alabama Department of Transportation
c/o Office Engineer Bureau
1409 Coliseum Boulevard
Montgomery, AL 36110

Dear Office Engineer Bureau,

I am currently a graduate student here at the Civil and Coastal Engineering Department at the University of Florida.

I am currently working on my thesis which is to evaluate the cost-effectiveness of performance bonds. In order to do this, I need to obtain information for all awarded public transportation construction contracts for the last two years (September 07 to September 09).

The information I am seeking is the name of contractor, type of project, the amount awarded for the project, and if the contractor defaulted on the project (had the contract for the project terminated through some fault of the contract) or not. I am currently contacting all 50 DOTs to be able to do this analysis on a national level.

Thank you for helping me gather information for my thesis.

Sincerely,

Lorena Myers

Figure 3-1. The Alabama Department of Transportation letter requesting contract information September 2009.

Below are a few of varying request forms were to the DOTs (Hawaii and Rhode Island) that have a public privacy act requirement that required forms to be filled out.

REQUEST TO ACCESS A GOVERNMENT RECORD

DATE: September 13, 2009

TO: Hawaii Department of Transportation

FROM: Lorena Myers
Name or Alias
117 NW 15th Street, Gainesville, FL 32603
Contact Information

Email address: lorenagutierrez@ufl.edu and for bigger files lorenagut@gmail.com

Although you are not required to provide any personal information, you should provide enough information to allow the agency to contact you about this request. The processing of this request may be stopped if the agency is unable to contact you. Therefore, please provide any information that will allow the agency to contact you (name or alias, telephone or fax number, mailing address, e-mail address, etc.).

I WOULD LIKE THE FOLLOWING GOVERNMENT RECORD:

Describe the government record as specifically as possible so that it can be located. Try to provide a record name, subject matter, date, location, purpose, or names of persons to whom the record refers, or other information that could help the agency identify the record. A complete and accurate description of the government record you request will prevent delays in locating the record. Attach a second page if needed.\

The information I am seeking is for all awarded public transportation construction contracts for the last two years (September 07 to September 09).

Name of contractor, the type of project, the project amount, if the project was defaulted (had the contract for the project been terminated through some fault of the contract) or not.

I WOULD LIKE: (please check one or more of the options below)

- To inspect the government record.**
- A copy of the government record:** (Please check one of the options below.) See the back of this page for information about fees that you may be required to pay for agency services to process your record request. Note: Copying and transmission charges may also apply to certain options.
- Pick up at agency (**date and time**): _____
- Mail
- Fax (toll free and only if available)
- Other, if available (please specify): [email to lorenagut@gmail.com](mailto:lorenagut@gmail.com)
- If the agency maintains the records in a form other than paper, please advise in which format you would prefer to have the record.
- Electronic Audio Other (please specify): _____
- Check this box if you are attaching a request for waiver of fees in the public interest (see waiver information on back).

SEE BACK FOR IMPORTANT INFORMATION

Figure 3-2. The Hawaii DOT request for information form sent September 2009.

FEES FOR PROCESSING RECORD REQUESTS

You may be charged fees for the services that the agency must perform when processing your record request, including fees for making photocopies and other lawful fees. **The first \$30 of fees charged for searching for a record, reviewing, and segregating will not be charged to you. Any amount over \$30 will be charged to you.** Fees are as follows:

Search for a Record	\$2.50 for 15 minutes
Review and Segregation of a Record	\$5.00 for 15 minutes

WAIVER OF FEES IN THE PUBLIC INTEREST

Up to \$60 of fees for searching for, segregating and reviewing records may be waived when the waiver would serve the public interest as described in section 2-71-32, Hawaii Administrative Rules. If you wish to apply for a waiver of fees in the public interest, you must attach to this request a statement of facts, including your identity as the requester, to show how the waiver of fees would serve the public interest. The criteria for this waiver, found at section 2-71-32, Hawaii Administrative Rules, are:

- (1) The requested record pertains to the operations or activities of an agency;
- (2) The record is not readily available in the public domain; and
- (3) The requester has the primary intention and the actual ability to widely disseminate information from the government record to the public at large.

AGENCY RESPONSE TO YOUR REQUEST FOR ACCESS

The agency to which you addressed your request must respond within a set time period. The agency will normally respond to you within 10 business days from the date it receives your request; however, in *extenuating circumstances* the agency must respond within 20 business days from the date of your request. If you have questions about the response time, you may contact the agency's UIPA contact person. If you are not satisfied with the agency's response, you may call the Office of Information Practices at 808-586-1400.

REQUESTER'S RESPONSIBILITIES

You have certain responsibilities under §2-71-16, Hawaii Administrative Rules. You may obtain a copy of these rules from the Lieutenant Governor's Office or from the Office of Information Practices. These responsibilities include making arrangements to inspect and copy records, providing further clarification or description of the requested record as instructed by the agency's notice, and making a prepayment of fees, if assessed.

Figure 3-2. Continued

REQUEST TO INSPECT AND/OR COPY RECORDS
OF THE
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

THIS FORM MUST BE COMPLETED IN FULL, SIGNED & DELIVERED TO:

OFFICE OF LEGAL COUNSEL
RHODE ISLAND DEPARTMENT OF TRANSPORTATION
ROOM 250, TWO CAPITOL HILL
PROVIDENCE, RHODE ISLAND 02903

PLEASE NOTE: FAILURE TO ANSWER ALL QUESTIONS ON THIS FORM WILL
RESULT IN YOUR REQUEST BEING RETURNED TO YOU FOR COMPLETION.

NAME OF PERSON MAKING REQUEST: Lorena Myers

ADDRESS OF PERSON MAKING REQUEST: 117 NW 15th Street,
Gainesville, FL 32603

TELEPHONE NUMBER: 1-505-620-2849

TITLE OF DOCUMENT(S) REQUESTED TO BE INSPECTED OR COPIED:
A copy of highway projects contract records
from Sept. '07 to Sept '09.

GENERAL DESCRIPTION OF SUBJECT MATTER OF DOCUMENT(S):
Want to know the name of the contractor the award
was given to, the type of project, the cost of the project
and if the project was defaulted by the contractor or not.

NAME & TITLE OF PERSON AT RIDOT HAVING CUSTODY OF REQUESTED
DOCUMENT(S), IF KNOWN:

Not available.

REQUEST IS MADE TO (Circle Your Choice): INSPECT ONLY OBTAIN COPIES

Copies of any documents are fifteen cents (\$.15) or the actual reproduction cost for paper larger than 8 1/2" by 14", plus an hourly charge of fifteen dollars (\$15.00) per hour for searching and copying, unless otherwise provided for by rules & regulations promulgated by RIDOT.

**THE INFORMATION REQUESTED (CIRCLE ONE): IS/IS NOT SOUGHT FOR
PURPOSES OF LITIGATION AGAINST THE STATE OF RHODE ISLAND AND/OR ITS
DEPARTMENT OF TRANSPORTATION.**

09/15/09
DATE

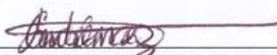

SIGNATURE OF PERSON MAKING REQUEST

Figure 3-3. The Rhode Island DOT request for information form sent September 2009.

Some challenges in obtaining information regarding defaults included the performance bond cost to the surety after default had occurred. That is, how much the surety spent to hire a new contractor, and the legal costs to investigate whether or not the default is legal based on the contract conditions. The assumption was, therefore, made that the surety cost, for defaulted projects, was 50 percent; which is a conservative approach. On the topic of approach, the next section discusses the method used to categorize the data.

3.3 Data Organization

In the public work sector that is specifically controlled by the DOTs, projects can be federal, state or combined federal and state. In addition, projects can be categorized into several sub sections such as bridges, electrical, maintenance, clearing (cleaning shrubbery), roadway resurfacing, roadway rehabilitation, and, from the MTO model, “contractors are rated in five work classifications: general road, structures, electrical, structural coating, and general maintenance (7).

As illustrated above, there were many ways in which the data could have been categorized. During the data collection period, the initial approach to categorized projects was in terms of defaulted projects that would have defined the data set into the most and least at risk projects. To be able to do that, the data would have had to been placed into specific categorizes that would make the analysis consistent. That is, for example, all the projects being analyzed would have had to be roadway surfacing and complete bid. Due to the time period of the analysis, categorizing projects in this fashion would have been a little challenging since 30 states were being analyzed. So, the methodology was redefined to take a look at defaulted projects. Since performance bonds have a direct relationship to defaulted projects, the decision was made to do the analysis based on defaulted projects.

The first step in the analysis was to obtain an estimate of the surety performance bond premium. Many surety reports indicate that surety bonds, a dependable, proven, and reliable protection against contractor failure, cost between one and three percent of the total contract price. On very large projects, surety bonds may cost less than one percent. Surety bonds are a wise investment in protecting an owner from contractor default (12). Likewise, the SFAA reports the cost of the performance bond one-time premium as typically ranging from 0.5 – 2 percent of the contract amount. The information gathered from SFAA helped to categorizing the projects, in terms of performance bond premium (13), into four categories as shown in Table 3-1 below.

Table 3-1. Performance Bond one-time premium as reported by SFAA.

Contract Amount	Performance Bond Premium	Project Size Category	Percentage
\$100, 000	\$1, 200 to \$2, 500	< \$1 Million	2.50%
\$1 Million	\$7, 700 to \$13, 500	\$1 Million to < \$10 Million	1.35%
\$10 Million	\$56, 950 to \$81, 000	\$10 Million to < \$50 Million	0.81%
\$50 Million	\$206, 475 to \$341, 000	> \$50 Million	0.68%

Table 3-1 shows performance bond premium for various contract amounts. Based on these surety reports, that provided a range for performance bond premium, the decision was made to use the upper limit of the performance bond premium in Table 3-1, with a corresponding monetary category, to estimate a percentage. The first two categories were given in the surety report. Values in the “Project Size Category” column were added in order to allow calculation of bond premium cost for all projects as is shown in Appendix A. Values in the “Percentage” column were calculated using the upper limit performance bond premium from column 2 and dividing it by the contract amount, the first column and multiplying the result by 100 percent. An alternative way (courtesy of a Federal Highway Administration official) to approach establishing percentages for performance bond premiums would be to divided the averages of column 2

premiums by the column 1 contract amounts and the result would be 3.7%, 1.06%, 0.69%, and 0.55%. The cost of a performance bond premium will vary because it is dependent on the size and type of the project and the contractor's bonding capacity (13). Looking at the percentage in the last column, the table shows that percentage decrease as the size of the project increases. The reason is because mega projects are broken into smaller portions as discussed below.

It is not uncommon in today's construction environment for projects to exceed \$500 million or even \$1 billion. Tremendous population growth has spurred the need for infrastructure improvements and many of these public construction initiatives exceed \$1 billion. Many sureties prefer to spread their risk by having project owners break up a large megaproject into multiple large projects (to the extent they can be broken up), notes Mike Cusack, senior vice president, managing director and operations board member, Aon Construction Services Group. "Sureties want multiple contractors on multiple projects," he explains. "If the logistics of a megaproject prevent breaking the job into multiple projects, the surety industry will require joint venture participation of well-qualified and well-capitalized construction companies. Terry Cavanaugh, chief operating officer, Chubb Surety, adds, "A benefit to breaking a large project up into smaller contracts is increased competition. Smaller contracts attract more contractors who have the capability to bid on a project (14)."

Bill Marino, chairman and CEO, Allied North America, says, "From the perspective of the owner, joint ventures and the corresponding co-surety structure necessary to support the larger bond penal sums are beneficial. There is a joint and several contractual relationships that exist between the contractors and the owner, as well as a joint and several relationships that exist between the co-sureties and the owner. In the event that one of the joint venture's contracting entities fails, it becomes the responsibility of their partners to assume their contractual

responsibility. Similarly, in the event that one of the co-sureties is not capable of meeting their obligations under the bond, it becomes the responsibility of the remaining sureties to assume their exposure (14).” This seems to indicate that sureties analyze how provide the coverage necessary to provide performance bonding in an economical way and minimize problems that would typically arise. The upcoming section provides and discusses the results of the methodology use to analyze the cost-effectiveness of performance bonding.

CHAPTER 4
RESULTS, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter takes presents the results, analysis and discussion to determine whether it is cost effective to use performance bonds or not.

4.2 Results

In order to do the cost-effectiveness analysis of performance bonds, an analysis of the benefit/cost of having performance bonds in the four states with defaulted projects for the last two years (September 2007 to September 2009) was done. The total costs of the defaulted projects as a ratio of the total number of projects is discussed as well. Other information that is included are the percentage complete of the projects when default occurred and the total number of defaulted contractors out of the total number of contractors that received project awards from the four states fitting the category of having defaults. To start of the analysis, information about all states projects and total default information is given in Table 4-1 below.

Table 4-1 below shows the number of defaults for each state and the approximate total number of projects for research period 2007 to 2009. All values entered in the tables are as reported by the states.

Table 4-1. States' total number of defaults and projects information for '07-'09.

No.	State	Number of Defaults	Total Projects
1	Alabama	7	631
2	Alaska	0	187
3	Arizona	0	205
4	Arkansas	0	408
5	California	0	1237
6	Colorado	0	326
7	Connecticut	0	134
8	Delaware	0	170
9	Georgia	19	513
10	Hawaii	0	129
11	Idaho	2	188
12	Illinois	0	2682

Table 4-1. Continued

No.	State	Number of Defaults	Total Projects
13	Iowa	0	1424
14	Kansas	0	643
15	Maine	0	545
16	Michigan	0	1303
17	Minnesota	0	447
18	Mississippi	2	392
19	Montana	0	231
20	New Jersey	0	256
21	New Mexico	0	126
22	New York	0	559
23	Ohio	0	1393
24	South Carolina	6	681
25	South Dakota	0	292
26	Texas	1	1333
27	Washington	0	650
28	West Virginia	0	945
29	Wisconsin	0	901
30	Wyoming	0	204

4.3 Analysis

Using Table 3-1, the percentage cost of the performance bond premium was applied to each project for all 30 states. Appendix A Table A-1 shows how the individual projects are categorized in the corresponding price range and percent bond premium cost to surety. Table 4-2 below shows the original cost of all projects, the cost of bond premium to the surety and the total number of projects for all 30 states. The total cost of all states projects combined for the last two years was \$51, 927, 090, 826 and the total cost of all performance bond premiums was \$593, 000, 000 or an equivalent of 1.142 percent of the total project costs. The total number of projects awarded was 19, 173. Please note that, in the case of Idaho, the contract awards data could only be obtained up to December of 2008 because the data prior to that was deleted from the website. Courtesy of a Federal Highway Administration official, the percent obtained in Table 4-2 is around 1 percent and does not compare with MTO's 5 percent (7). In section 3.3 Data Organization section, the reason for a decrease in interest rate as the performance bond premium

increased was because sureties had discovered how to work together to reduce the cost of projects. There is reason to believe that this might contribute to the difference between the percentages.

Table 4-2. States Original cost of projects, Bond Premium to Surety and total projects information for '07 – '09.

No.	State	Original Cost	Bond Premium	Total Projects
1	Alabama	\$1,442,902,272.23	\$17,692,293.41	631
2	Alaska	\$809,449,179.23	\$8,573,850.53	187
3	Arizona	\$1,600,656,820.58	\$14,350,967.89	205
4	Arkansas	\$817,217,457.10	\$10,312,799.89	408
5	California	\$4,511,000,828.23	\$46,107,973.83	1237
6	Colorado	\$798,099,709.03	\$10,270,813.75	326
7	Connecticut	\$1,463,076,429.07	\$12,356,052.58	134
8	Delaware	\$354,338,346.14	\$4,829,758.68	170
9	Georgia	\$1,536,868,015.91	\$18,034,485.62	513
10	Hawaii	\$430,535,237.92	\$4,653,012.66	129
11	Idaho	\$644,374,838.04	\$7,230,086.94	192
12	Illinois	\$3,670,007,329.67	\$53,195,750.67	2682
13	Iowa	\$1,711,395,839.83	\$24,617,299.54	1424
14	Kansas	\$1,144,606,054.61	\$13,622,288.39	643
15	Maine	\$1,152,569,066.57	\$15,359,930.09	545
16	Michigan	\$2,160,533,881.73	\$29,027,635.42	1303
17	Minnesota	\$1,666,376,259.62	\$17,370,360.55	447
18	Mississippi	\$1,356,422,262.75	\$15,484,356.48	392
19	Montana	\$579,074,020.80	\$7,449,512.95	231
20	New Jersey	\$1,928,373,439.99	\$18,668,802.95	256
21	New Mexico	\$775,577,646.78	\$7,759,073.65	126
22	New York	\$2,834,889,153.48	\$28,678,216.00	559
23	Ohio	\$2,856,017,473.98	\$34,688,219.00	1393
24	South Carolina	\$1,138,306,766.89	\$15,519,605.09	715
25	South Dakota	\$582,638,520.64	\$7,476,267.89	292
26	Texas	\$5,453,915,663.07	\$59,887,883.77	1333
27	Washington	\$4,357,111,404.32	\$39,615,276.95	650
28	West Virginia	\$1,162,017,166.16	\$14,968,176.68	945
29	Wisconsin	\$2,310,381,065.44	\$27,875,716.65	901
30	Wyoming	\$678,358,676.51	\$7,670,376.36	204

Table 4-3 below provides information on defaulted contracts. It shows the contractor (for privacy, the name of the contractor was replaced with a letter and the states with the corresponding defaults were not mentioned), the type of project, the contract award amount and

the approximate percentage of the project that was completed at the time of default. For projects that had a bid range of \$390,000 to \$480,000 the upper limit was used at the contract award amount. The number of projects that were the same project type was numbered to show the number of occurrence of that project type in the defaults. All values for columns 1, 2, 3 and 5 are as reported by the states that had defaults. Column 3 values were either obtained directly from the DOT or obtained via internet on the state's website. Looking at the highest number of defaults that occurred from any one contractor, contractor D defaulted on 17 projects. The assumption is made that in the last two years, he/she was awarded projects because of good performance or performance bond standing but went bankrupt and defaulted on the projects all at once.

Table 4-3. All 7 States default contractor, type of default, cost of project and approximate percent complete of project at time of default for 2007 – 2009.

No	Contractor	Type of Project	Contract Amount	Approximate % Complete at Default
1	A	Grade, Drainage, Pavement, Bridge and Signals	\$6, 189, 906.60	100
2	A	Bridge Replacement (bridge culvert) and Approaches (Project 1)	\$714, 000.00	100
3	A	Removal of Structures at the Salvage Yard	\$480, 000.00	100
4	B	Widening (Project 1)	\$2, 950, 000.00	66
5	B	Bridge Replacement and Approaches (Project 2)	\$4, 000, 000.00	68
6	B	Relocation	\$3, 475, 000.00	65
7	C	Bridge Approaches (Project 3)	-	100
8	D	State Route Surfacing (Project 1)	\$738, 130.00	0

Table 4-3 Continued.

No	Contractor	Type of Project	Contract Amount	Approximate % Complete at Default
9	D	State Route Surfacing (Project 2)	\$1,409,580.00	0
10	D	Widening (Project 2)	\$9,376,306.00	80
11	D	Widening (Project 3)	\$77,789,276.00	90
12	D	Widening (Project 4)	\$55,281,144.00	70
13	D	Widening (Project 5)	\$40,749,261.00	40
14	D	Widening (Project 6)	\$12,469,439.00	65
15	D	Widening (Project 7)	\$17,819,608.00	45
16	D	Widening (Project 8)	\$18,862,592.00	40
17	D	Widening (Project 9)	\$18,811,311.00	0
18	D	Widening (Project 10)	\$4,624,063.00	70
19	D	State Route Surfacing (Project 3)	\$2,129,159.00	30
20	D	State Route Surfacing (Project 4)	\$1,777,346.00	25
21	D	Bridge Replacement (Project 1)	\$3,728,832.00	60
22	D	Bridge Replacement (Project 2)	\$2,558,669.00	50
23	D	New Construction	\$16,601,857.00	99
24	D	Interchange Reconstruction	\$9,761,799.00	99
25	E	Widening (Project 11)	\$26,292,771.00	85
26	E	Widening (Project 12)	\$12,469,439.00	99
27	F	Concrete Sidewalks and Signage	\$496,316.00	0
28	F	Minor Excavation and Paving Pathway	\$208,542.00	0

Table 4-3 Continued.

No	Contractor	Type of Project	Contract Amount	Approximate % Complete at Default
29	-	Building	-	10
30	-	Bridge Painting	-	75
31	G	Traffic Signals	\$1,496,890.00	-
32	H	Widening (Project 13)	\$14,520,727.00	-
33	I	Sidewalk	\$177,213.98	-
34	J	Widening (Project 14)	\$1,794,116.89	-
35	J	Intersection Improvements	\$1,203,259.03	-
36	J	Intersection Improvements	\$2,159,894.85	-
37	K	Wastewater Treatment	\$748,780.00	0

- Information could not be found

For the purposes of this research, the definition of a state that was in true default was one that had a contractor defaulted on an awarded roadway project that excluded buildings. Based on this, two states out of the six were excluded for the benefit cost analysis. Table 4-4 below shows the total number of defaulted contractors, contractors, and number of projects for the four states that fit the definition of having defaults. For Alabama, the total number of defaulted contractors, for the last two years, was 3 for a total number of 7 defaulted projects (See Table 4-1 above). Two contractors defaulted on 3 projects each. Highest number of contracts awarded to one contractor was 48 projects. For Georgia, the total number of defaulted contractors, for the last two years, was 2 for a total number of 19 defaulted projects. One contractor defaulted 17 of those 19 projects (Table 4-1 above). Although 17 seems like a large number of projects for one contractor. It is not uncommon for one contractor to have many projects. For example, one

contractor was awarded 102 projects. Looking at Idaho, the total number of defaulted contractors was 1 for a total number of 2 defaulted projects (Table 4-1 above). Highest number of contracts awarded to one contractor was 18. Finally, South Carolina total number of defaulted contractors was 4 for a total number of 6 defaulted projects (Table 4-1 above). Highest number of contracts awarded to one contractor was 69 projects.

Table 4-4. States total number of defaulted contractors, contractors and projects.

State	Total number of defaulted contractors	Total number of contractors	Total number of projects
Alabama	3	105	631
Georgia	2	91	513
Idaho	1	75	188
South Carolina	4	111	681

In developing Table 4-5 below to calculate the total cost of performance bond premiums (last column) for each of the four states, the assumption is made that the surety pays 50 percent of performance bond to complete the project, representing a benefit to the DOT from the use of performance bonds.

Based on the 2008 surety market overview, the surety industry lost half of the total money spent on defaults during the years 2002 – 2005. SFAA reports that sureties have paid more than \$11 billion on contractor defaults since 1994. Half of that was paid between 2002 and 2005 (15).

Table 4-5. States total cost of default projects, 50% of total cost of default projects and surety cost of all projects for 2007 – 2009.

State	Total cost of Defaulted Projects	50% of total cost of Defaulted Projects	Total Cost of Bond Premiums
Alabama	\$17, 598, 906. 60	\$8, 799, 453.30	\$17, 692, 293.41
Georgia	\$332, 347, 230	\$166, 173, 615.00	\$18, 034, 485.62
Idaho	\$704, 858.00	\$352, 429.00	\$7, 067, 183. 59
South Carolina	\$7, 974, 633.78	\$3, 987,316.89	\$14, 666, 964.23

Table 4-6 below shows the benefit/cost (B/C) ratio from the use of performance bonds by the four states during the 2007-2009 analysis period. The benefit/cost ratio is obtained by dividing the values in the “50% of Total Cost of Defaulted Projects” column (a benefit to the

state) by the values in the “total cost of bond premiums” column (a cost to the state). From the results, one can see that Georgia is the only state where the benefits outweighed the costs. In the other three states, the sureties made a profit. Courtesy of a Federal Highway Administration official, sureties are in it for the money, and they deserve to make some profit in view of the risk they are taking and the service they provide. But the amount of profit they are making, especially at the expense of DOTs that have few or no defaults, is simply staggering. It shows that there is a need to seriously think about replacing performance bonds with another system such as the (Ontario Model) in Synthesis 390. While Table 4-8 gives B/C ratios for the states; it is a simple matter to calculate B/C ratios from the surety’s viewpoint as they are the inverse of the state B/C ratios. A state B/C is 0.50 translates to a surety B/C of 2.0. In other words, if benefits to the state are 1/2 of costs, then costs to the state (which are benefits to the surety) are twice the expenses to the surety. The B/C ratios from the viewpoint of the surety are 2 (AL), 0.11 (GA), 20 (ID), and 3.70 (SC). Of course, additional costs to the surety for finishing defaults projects decrease the surety B/C somewhat.

Table 4-6. States surety cost of default projects for 2007 – 2009 in relation to the total surety cost of all projects for the same time period.

State	50% of total cost of Defaulted Projects (B)	Total Cost of Bond Premiums (C)	Benefit/Cost (B/C) Ratio for State
Alabama	\$8, 799, 453.30	\$17, 692, 293.41	0.50
Georgia	\$166, 173, 615.00	\$18, 034, 485.62	9.21
Idaho	\$352, 429.00	\$7, 067, 183. 59	0.05
South Carolina	\$3, 987,316.89	\$14, 666, 964.23	0.27

Table 4-7 below shows the total number of defaulted projects, total cost of the defaulted projects, total number of all projects and the total cost of all projects for the four states with defaults. The values for the total number of defaulted projects for each state can also be found in Table 4-1.

Table 4-7. States default projects and cost, all projects and total cost for 2007 to 2009.

State	Defaulted Projects	Total cost of Defaulted Projects	All Projects	Total cost of All Projects
Alabama	7	\$17, 598, 906. 60	631	\$1, 443, 162, 230.10
Georgia	19	\$332, 347, 230.00	513	\$1, 536, 868, 015.91
Idaho	2	\$704, 858.00	188	\$629, 142, 232.99
South Carolina	6	\$7, 974, 633.78	681	\$1, 061, 600, 282.34

Table 4-8 below shows the total cost of defaulted projects, in the first column, the total cost of all projects, representing a cost to the surety, in the second column and the percent of defaulted projects to total number of projects, in third column. The value of “% Defaulted Project of All Projects” is obtained by dividing the value of “Total cost of Defaulted Projects” by the value of “Total cost of All Projects” and multiplying by a 100 percent.

Table 4-8. States cost of default projects as a percent of total cost of projects for 2007 to 2009.

State	Total cost of Defaulted Projects	Total cost of All Projects	% Default Project of All Projects
Alabama	\$17, 598, 906. 60	\$1, 443, 162, 230.10	1.219
Georgia	\$332, 347, 230	\$1, 536, 868, 015.91	21.625
Idaho	\$704, 858.00	\$629, 142, 232.99	0.112
South Carolina	\$7, 974, 633.78	\$1, 061, 600, 282.34	0.751

To summarize Tables 4-6 and 4-8, Alabama total cost of defaulted projects as a percentage of the total cost of projects was 1.22 percent and its Benefit/Cost (B/C) was 0.50. Georgia cost of default was 21.63 percent but its B/C was 9.21. Idaho cost of default was 0.11 percent and B/C was 0.05. South Carolina cost of default was 0.75 percent with a B/C of 0.27. The results indicate that during the 2-year analysis period, it turned out that Alabama’s, Idaho’s and South Carolina’s requirements for performance bonding (which includes their criteria for defaulting) were not cost effective. For Georgia, the use of performance bonds was cost effective primarily because that state had a relatively large number of defaults for some reason.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This chapter presents conclusions and recommendations from this research study. The study compared the total cost of project performance defaults to the surety (a benefit to the state) against the total cost of premiums to arrive at a cost/benefit ratio for the state. When the benefits exceed the costs, the ratio is greater than 1, and the use of performance bonds can be viewed as being cost effective.

5.2 Conclusions

For the September 2007 to September 2009 analysis period, it turns out that the use of performance bonding in Alabama, Idaho, and South Carolina was not cost effective to those states. For Georgia, indications are the use of performance bonds was cost effective, primarily because that state had a relatively large number of defaults for some reason. Also, it is obvious from the collected data that for the remaining 26 states that provided data, the use of performance bonds in those states was not cost effective. Thus, the data and its analysis indicates Georgia was the only state where having a performance bond requirement proved to be cost effective. However, one should not reach the conclusion that Georgia was a “winner.” Certainly, having a relatively large number of defaulted projects was not their goal. We must keep in mind too that sureties might well raise the cost of premiums on Georgia’s projects based on that state’s recent history. The cost of premiums in Ontario was cited as 5 percent compared to the 2007-2009 national U.S. average of 1.139 percent (which is also close to the Georgia average).

Although no analysis was done, it was interesting to see from the collected data that the project type experiencing the highest number of defaults was widening (14 out of 37). From the collected data also out of the total number of defaults of one state that had 19 defaults, one

contractor defaulted 17 times out of the 19. It can be assumed that contractor probably had a good past performance record and that it probably went bankrupt all at once resulting in numerous defaulted projects.

An analogy to illustrate how performance bonds work is that of car insurance. Car insurance has coverage duration. Likewise, performance bonds have coverage duration. A safe driver, who has never been in an accident, does not benefit from having the insurance because the terms and conditions of the contract are such that the insurance will only come into effect in the event of an accident. A terrible driver, on the other hand, who is continually having accidents, it is beneficial to have car insurance. The only catch is that the percentage of the car insurance premium goes up every time that driver gets into an accident. Likewise, states that experience defaults benefit from having performance bonding. But if no defaults occur, states do not see a benefit. In light of this, this research results is not suggesting getting rid of performance bonding. The recommendation would be to require performance bonding on projects that are more likely to be defaulted.

5.3 Recommendations

For the cost effectiveness of performance bonds to be more fully and better analyzed, more detailed information about the benefits and cost to the agency, contractor and surety need to be collected. For example, analyzing projects using different categories such as duration of projects, type of projects (roadway surfacing, roadway rehabilitation, roadway preventative maintenance, hot mix asphalt roadway, concrete roadway, bridge replacement, traffic, drainage, electrical, federal, state, combined state and federal, design-bid-build, competitive bid, and so on) would help to give a clearer picture of which projects are problematic and would require performance bonding.

Future data collection and analysis efforts could also examine:

- Contractors who go bankrupt under one name but later surface under a new name for business are awarded projects after having a history of poor performance.
- State practices with respect to whether performance bonds are required for all projects or for only a selected few.
- State practices with respect to establishing what criteria constitute a default and how well the criteria are enforced.
- Do a more in depth study of states laws and requirements for performance bonds and whether or not it can be waived.
- Whether current state laws would allow performance bonds to be replaced (either partially or completely) with another system to better assure satisfactory contractor performance.
- It would be of interest and likely beneficial to compare the criteria for defaulting among various states as it was beyond the scope of study.
- Defaults between the years 2002 and 2005 since the surety industry lost half of the total money spent on defaults during that time period (15).

APPENDIX A
CATEGORIZING PROJECTS USING SURETY BOND PREMIUMS

Table A-1 shows the bond premium categorizes for the individual projects for each of the 30 states. For all 30 states, the original cost of the projects, the total cost of the performance bond premium and the total number of projects to the corresponding price range and percentage performance bond premium cost were calculated for the period, September 2007 to September 2009, as is shown below.

Table A-1. States original and surety cost for all projects with corresponding price range and percent bond premium from '07 to '09.

No.	State	Total	< \$1, 000, 000	\$1, 000, 000 to < \$10, 000, 000	\$10, 000, 000 to < \$50, 000, 000	≥ \$50, 000, 000
% Bond Premium			2.50%	1.35%	0.81%	0.68%
1	Alabama					
	Original	\$1, 442, 902, 272.23	\$132, 474, 640.47	\$747, 101, 397.59	\$356, 877, 033.84	\$206, 449, 200.33
	Surety	\$17, 692, 293.41	\$3, 311, 866.01	\$10, 085, 868.87	\$2, 890, 703.97	\$1, 403, 854.56
	Projects	631	317	291	20	3
2	Alaska					
	Original	\$809, 449, 179.23	\$28, 924, 415.73	\$307, 328, 039.48	\$372, 364, 528.02	\$100, 832, 196.00
	Surety	\$8, 573, 850.53	\$723, 110.39	\$4, 148, 928.53	\$3, 016, 152.68	\$685, 658.93
	Projects	187	85	84	17	1
3	Arizona					
	Original	\$1, 600, 656, 820.58	\$36, 969, 400.44	\$315, 830, 048.45	\$521, 228, 538.09	\$726, 628, 833.60
	Surety	\$14, 350, 967.89	\$924, 235.01	\$4, 263, 705.65	\$4, 221, 951.16	\$4, 941, 076.07
	Projects	205	90	82	25	8
4	Arkansas					
	Original	\$817, 217, 457.10	\$111, 924, 706.33	\$333, 668, 694.81	\$371, 624, 055.96	\$0.00
	Surety	\$10, 312, 799.89	\$2, 798, 117.66	\$4, 504, 527.38	\$3, 010, 154.85	\$0.00
	Projects	408	287	100	21	0
5	California					
	Original	\$4, 511, 000, 828.23	\$331, 944, 690.43	\$1, 218, 728, 951.81	\$943, 300, 659.23	\$2, 017, 026, 526.76
	Surety	\$46, 107, 973.83	\$8, 298, 617.26	\$16,452,840.85	\$7,640,735.34	\$13, 715, 780.38
	Projects	1237	763	412	53	9

Table A-1. Continued

No.	State	Total	< \$1, 000, 000	\$1, 000, 000 to < \$10, 000, 000	\$10, 000, 000 to < \$50, 000, 000	≥ \$50, 000, 000
	% surety cost		2.50%	1.35%	0.81%	0.68%
6	Colorado					
	Original	\$798, 099, 709.03	\$81, 609, 342.47	\$449, 446, 337.21	\$267, 044, 029.35	\$0.00
	Surety	\$10, 270, 815.75	\$2, 040, 233.56	\$6, 067, 525.55	\$2, 163, 056.64	\$0.00
	Projects	326	183	128	15	0
7	Connecticut					
	Original	\$1, 463, 076, 429.07	\$17, 875, 621.07	\$271, 601, 144.44	\$340, 052, 994.34	\$833, 546, 669.22
	Surety	\$12, 536, 052.58	\$446, 890.53	\$3, 666, 615.45	\$2, 754, 429.25	\$5, 668, 117.35
	Projects	134	27	85	16	6
8	Delaware					
	Original	\$354, 338, 346.14	\$34, 422, 325.93	\$255, 163, 105.34	\$64, 752, 914.87	\$0.00
	Surety	\$4, 829, 758.68	\$860, 558.15	\$3, 444, 701.92	\$524, 498.61	\$0.00
	Projects	170	72	94	4	0
9	Georgia					
	Original	\$1, 536, 868, 015.91	\$115, 876, 995.82	\$684, 916, 865.40	\$681, 445, 220.94	\$54, 628, 933.75
	Surety	\$18, 034, 485.62	\$2, 896, 924.90	\$9, 246, 377.68	\$5, 519, 706.29	\$371, 476.75
	Projects	513	203	276	33	1
10	Hawaii					
	Original	\$430, 535, 237.92	\$23, 229, 093.12	\$173, 449, 671.48	\$108, 069, 811.27	\$125, 786, 662.05
	Surety	\$4, 653, 012.66	\$580, 727.33	\$2, 341, 570.56	\$875, 365.47	\$855, 349.30
	Projects	129	67	54	6	2

Table A-1. Continued

No.	State	Total	< \$1, 000, 000	\$1, 000, 000 to < \$10, 000, 000	\$10, 000, 000 to < \$50, 000, 000	≥ \$50, 000, 000
	% surety cost		2.50%	1.35%	0.81%	0.68%
11	Idaho					
	Original	\$644, 374, 838.04	\$37, 972, 654.84	\$253, 502, 386.34	\$352, 899, 796.86	\$0.00
	Surety	\$7, 230, 086.94	\$949, 316.37	\$3, 422, 282.22	\$2, 858, 488.35	\$0.00
	Projects	192	85	91	16	0
12	Illinois					
	Original	\$3, 670, 007, 329.67	\$701, 218, 192.87	\$2, 146, 934, 853.88	\$821, 854, 282.92	\$0.00
	Surety	\$53, 195, 750.67	\$17, 530, 454.82	\$28, 983, 620.53	\$6, 681, 675.32	\$0.00
	Projects	2682	1779	856	47	0
13	Iowa					
	Original	\$1, 711, 395, 839.83	\$314, 246, 272.48	\$1, 021, 708, 589.57	\$319, 290, 845.43	\$56, 150, 132.35
	Surety	\$24, 617, 299.54	\$7, 856, 156.81	\$13, 793, 065.96	\$2, 586, 255.85	\$381, 820.92
	Projects	1424	1043	360	20	1
14	Kansas					
	Original	\$1, 144, 606, 054.61	\$144, 746, 074.32	\$393, 557, 328.76	\$436, 734, 278.85	\$169, 568, 372.68
	Surety	\$13, 622, 288.39	\$3, 618, 651.86	\$5, 313, 023.94	\$3, 537, 547.66	\$1, 153, 064.93
	Projects	643	454	170	16	3
15	Maine					
	Original	\$1, 152, 569, 066.57	\$85, 949, 667.88	\$846, 587, 271.14	\$220, 032, 127.55	\$0.00
	Surety	\$15, 359, 930.09	\$2, 148, 741.70	\$11, 428, 928.16	\$1, 782, 260.23	\$0.00
	Projects	545	216	318	11	0

Table A-1. Continued

No.	State	Total	< \$1, 000, 000	\$1, 000, 000 to < \$10, 000, 000	\$10, 000, 000 to < \$50, 000, 000	≥ \$50, 000, 000
	% surety cost		2.50%	1.35%	0.81%	0.68%
16	Michigan					
	Original	\$2, 160, 533, 881.73	\$378, 777, 867.31	\$961, 959, 757.17	\$767, 013, 437.11	\$52, 782, 820.14
	Surety	\$29, 027, 635.42	\$9, 469, 446.68	\$12, 986, 456.72	\$6, 212, 808.84	\$358, 923.18
	Projects	1303	884	381	37	1
17	Minnesota					
	Original	\$1, 666, 376, 259.62	\$94, 979, 572.47	\$516, 666, 194.76	\$652, 854, 045.84	\$401, 876, 446.55
	Surety	\$17, 370, 360.55	\$2, 374, 489.31	\$6, 974, 993.63	\$5, 288, 117.77	\$2, 732, 759.84
	Projects	447	255	167	21	4
18	Mississippi					
	Original	\$1, 356, 422, 262.75	\$62, 546, 654.17	\$637, 092, 166.86	\$656, 783, 441.72	\$0.00
	Surety	\$15, 484, 356.48	\$1, 563, 666.35	\$8, 600, 744.25	\$5, 319, 945.88	\$0.00
	Projects	392	131	225	36	0
19	Montana					
	Original	\$579, 074, 020.80	\$49, 215, 765.53	\$356, 901, 284.09	\$172, 956, 971.18	\$0.00
	Surety	\$7, 449, 512.95	\$1, 230, 394.14	\$4, 818, 167.34	\$1, 400, 951.47	\$0.00
	Projects	231	118	102	11	0
20	New Jersey					
	Original	\$1, 928, 373, 439.99	\$35, 386, 837.63	\$638, 562, 248.71	\$487, 273, 878.46	\$767, 150, 475.19
	Surety	\$18, 668, 802.95	\$884, 670.94	\$8, 620, 590.36	\$3, 946, 918.42	\$5, 216, 623.23
	Projects	256	64	162	25	5

Table A-1. Continued

No.	State	Total	< \$1, 000, 000	\$1, 000, 000 to < \$10, 000, 000	\$10, 000, 000 to < \$50, 000, 000	≥ \$50, 000, 000
	% surety cost		2.50%	1.35%	0.81%	0.68%
21	New Mexico					
	Original	\$775, 577, 646.78	\$18, 809, 268.93	\$214, 632, 976.59	\$542, 135, 401.26	\$0.00
	Surety	\$7, 759, 073.65	\$470, 231.72	\$2, 897, 545.18	\$4, 391, 296.75	\$0.00
	Projects	126	41	57	28	0
22	New York					
	Original	\$2, 834, 889, 153.48	\$109, 786, 727.18	\$917, 850, 804.68	\$964, 038, 848.48	\$843, 212, 773.14
	Surety	\$28, 678, 216.00	\$2, 744, 668.18	\$12, 390, 985.86	\$7, 808, 714.67	\$5, 733, 846.86
	Projects	559	191	311	51	6
23	Ohio					
	Original	\$2, 856, 017, 473.98	\$368, 196, 143.06	\$1,160,198, 992.80	\$606, 713, 401.36	\$720, 768, 936.76
	Surety	\$34, 688, 219.00	\$9, 204, 903.58	\$15, 672, 406.40	\$4, 909, 680.55	\$4, 901, 288.77
	Projects	1393	876	478	31	8
24	South Carolina					
	Original	\$1, 138, 306, 766.89	\$186, 418, 629.25	\$598, 943, 168.60	\$287, 215, 994.04	\$65, 728, 975.00
	Surety	\$15, 519, 605.09	\$4, 660, 465.73	\$8, 805, 732.78	\$2, 326, 449.55	\$446, 957.03
	Projects	715	449	249	16	1
25	South Dakota					
	Original	\$582, 638, 520.64	\$56, 078, 678.69	\$335, 030, 779.61	\$191, 529, 062.34	\$0.00
	Surety	\$7, 476, 267.89	\$1, 401, 966.97	\$4, 522, 915.52	\$1, 551, 385.40	\$0.00
	Projects	292	168	111	13	0

Table A-1. Continued

No.	State	Total	< \$1, 000, 000	\$1, 000, 000 to < \$10, 000, 000	\$10, 000, 000 to < \$50, 000, 000	≥ \$50, 000, 000
	% surety cost		2.50%	1.35%	0.81%	0.68%
26	Texas					
	Original	\$5, 453, 915, 663.07	\$253, 284, 571.36	\$2, 345, 788, 359.55	\$1, 903, 612, 356.93	\$951, 230, 375.23
	Surety	\$59, 887, 883.77	\$6, 332, 114.28	\$31, 668, 142.85	\$15, 419, 260.09	\$6, 468, 366.55
	Projects	1333	501	732	92	8
27	Washington					
	Original	\$4, 357, 111, 404.32	\$129, 748, 428.51	\$839, 835, 852.36	\$1, 537, 382, 921.54	\$1, 850, 144, 201.91
	Surety	\$39, 615, 276.95	\$3, 243, 710.71	\$11, 337, 784.01	\$12, 452, 801.66	\$12, 580, 980.57
	Projects	650	300	270	66	14
28	West Virginia					
	Original	\$1, 162, 017,166.16	\$258, 125, 863.54	\$271, 944, 057.61	\$420, 418, 497.66	\$211, 528, 747.35
	Surety	\$14, 968, 176.68	\$6, 453, 146.59	\$3, 671, 244.78	\$3, 405, 389.83	\$1, 438, 395.48
	Projects	945	792	129	21	3
29	Wisconsin					
	Original	\$2, 310, 381, 065.44	\$197, 530, 189.66	\$1, 092, 894, 746.51	\$959, 754, 729.90	\$60, 201, 399.37
	Surety	\$27, 875, 716.65	\$4, 938, 254.74	\$14, 754, 079.08	\$7, 774, 013.31	\$409, 369.52
	Projects	901	462	384	54	1
30	Wyoming					
	Original	\$678, 358, 676.51	\$39, 672, 310.55	\$294, 462, 708.11	\$278, 923, 976.58	\$65, 299, 681.27
	Surety	\$7, 670, 376.36	\$991, 807.76	\$3, 975, 246.56	\$2, 259, 284.21	\$444, 037.83
	Projects	204	90	95	18	1

APPENDIX B
30 STATES PRACTICES – PERFORMANCE BONDS

Alabama Department of Transportation 2008 Standard Specifications General Provisions
Section 103 Award and Execution of Contract Subsection 103.05 Requirements of Contract
Bonds (a) Performance Bond specifies that the bidder to whom the award is made shall within 15
days after the prescribed forms have been presented to him for signature (i.e. after date of
award), furnish and file with the Transportation Director an acceptable surety bond on the form
included in the proposal in an amount equal to 100 percent of the contract bid price of the
contract awarded (16).

Alaska Department of Transportation and Public Facilities 2004 Standard Specifications
for Highway Construction General Provisions Section 103 Award and Execution of Contract
Subsection 103-1.05 Performance and Payment Bonds specifies that the successful bidder shall
furnish all required Performance and Payment Bonds on forms provide by the Department for the
sums specified in the Contract. If no sum is specified, the successful bidder shall comply with
AS 36.25.010 (17). AS 36.25.010 states for contracts exceeding \$100, 000 for the construction,
alteration, or repair of a public building or public work of the state or a political subdivision of
the state is awarded to a general or specialty contractor, the contractor shall furnish to the state or
political subdivision of the state the following bonds, which become binding upon the award of
the contract to that contractor: a performance bond with a corporate surety qualified to do
business in the state, or at least two individual sureties who shall each justify in a sum equal to
the amount of the bond; the amount of the performance bond shall be equivalent to the amount of
the payment bond.
(18).

Arizona Department of Transportation Standard Specifications 2001 Specifications for Road and Bridge Construction General Provisions Section 103 Award and Execution of Contract Subsection 103.07 Requirement of Contract Bonds specifies that the successful bidder shall furnish the DOT the following surety bond, which shall become binding upon the execution of the contract: a performance bond in the amount of 100 percent of the total contract amount, conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions thereof. Such bond shall be solely for the protection of the Department (19).

Arkansas State Highway and Transportation Department 2003 Standard Specification for Highway Construction General Provisions Section 103 Award and Execution of Contract Subsection 103.05 Requirement of Performance Bonds, Payment Bonds, and Liability Insurance (a) Bonds specifies that at the time of execution of the Contract, the successful bidder shall furnish a surety Performance bond or bonds in a sum equal to the full amount of the Contract and a surety Payment bond or bonds in a sum equal to 80 % of the full amount of the Contract (20).

California Department of Transportation (Caltrans) 2001 Specifications for Road and Bridge Construction General Provisions Section 103 Award and Execution of Contract Subsection 3-1.02 Contract Bonds specifies that the successful bidder shall furnish the 2 bonds required by the State Contract Act. One bond shall secure the payment of the claims of laborers, mechanics or materialmen employed on the work under the contract, and the other bond shall guarantee the faithful performance of the contract. The bond forms will be furnished to the successful bidder by the Department. Except as otherwise provided in Section 3248 of the Civil Code and Section 30154 of the Streets and Highways Code, the payment bond shall be in a sum

equal to the contract price and the performance bond shall be in a sum equal to at least one-half of the contract price (21).

Colorado Standard Specifications General Provisions Award and Execution of Contract Subsection 103.03 Requirement of Contract Bonds specify that at the time of the execution of the Contract, the successful bidder shall furnish a Contract Payment Bond and a Contract Performance Bond. Each bond shall be in a penal sum equal to the nearest integral one hundred dollars in excess of the sum of the original bid items plus all force account items specified in the project special provisions to be included in the payment and performance bonds (22).

Connecticut Department of Transportation Standard Specifications Division I General Requirements and Covenants Section 1.03 Award and Execution of Contract Subsection 1.03.04 Requirements of Performance Contract Bond and Payment Bond specifies that in conformance with Section 49-41a of the Connecticut General Statutes, as revised (23), specifies that each contract exceeding one hundred thousand dollars in amount for the construction, alteration or repair of any public building or public work of the state or a municipality shall include a provision that the person to perform the contract shall furnish to the state or municipality on or before the award date, a bond in the amount of the contract which shall be binding upon the award of the contract to that person, with a surety or sureties satisfactory to the officer awarding the contract, for the protection of persons supplying labor or materials in the prosecution of the work provided for in the contract for the use of each such person, provided no such bond shall be required to be furnished: in relation to any general bid in which the total estimated cost of labor and materials under the contract with respect to which such general bid is submitted is less than one hundred thousand dollars; in relation to any sub-bid in which the total estimated cost of labor and materials under the contract with respect to which such sub-bid is submitted is less than one

hundred thousand dollars; or in relation to any general bid or sub-bid submitted by a consultant, as defined in section 4b-55. Any such bond furnished shall have as principal the name of the person awarded the contract (24).

Delaware Department of Transportation 2001 Specifications for Road and Bridge Construction General Provisions Section 103 Award and Execution of Contract Subsection 103.05 Performance and Payment Bonds specifies that simultaneous with the execution of the Contract, the successful bidder shall furnish a surety bond or bonds in a sum equal to 100 percent of the Contract price to the state (25).

Georgia Department of Transportation Standard Specifications Award and Execution of Contract Subsection 103.05 Requirements of Contract Bonds specify that the penal sum of the Contract shall be defined as 120 percent of the Original Contract Amount. At the time of the execution of the Contract, and as a part thereof, the successful Bidder shall furnish Contract Bonds as specified: Georgia Resident Contractors shall furnish Performance and Payment Bonds as follows: Performance bond in the full penal sum of the Contract and payment bond in an amount equal to 110 percent of the full amount of the Contract. The aggregate amount of the bonds shall be 210 percent of the full penal sum of the Contract; Non-Resident Contractor shall furnish Contract Bonds as follows: Performance bond in the full penal sum of the Contract, payment bond in the full penal sum of the Contract and tax bond in the amount of 10 percent of the full penal sum of the Contract. The aggregate amount of the bonds shall be 210 percent of the full penal sum of the Contract. The tax bond shall represent the nonresident contractor bond required by the Revenue Department in accordance with Sections 48-13-30 through 48-13-38 of the Official Code of Georgia Annotated (26).

Hawaii Department of Transportation DOT/Federal Projects Special Provisions for 2005 Standard Specifications Subsection 103.05 Requirement of Contract Bond specifies that at the time of execution of the contract, the successful bidder shall file a good and sufficient performance bond and a payment bond on the forms furnished by the Department conditioned for the full and faithful performance of the contract in accordance with the terms and intent thereof and for the prompt payment to all others for all labor and material furnished by them to the bidder and used in the prosecution of the work provided for in the contract. The bonds shall be of an amount equal to 100 percent of the amount of the contract price and include 5 percent of the contract amount estimated to be required for extra work (27).

Idaho Transportation Department Standard Specifications Subsection 103.04 Bond Requirements specifies that the lowest qualified bidder shall furnish a performance bond and a payment bond equal to the full amount of the contract, in accordance with the applicable Idaho law. Idaho law states “a performance bond in any amount to be fixed by the contracting body, but in no event less than eighty-five percent (85%) of the contract amount conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions thereof. Said bond shall be solely for the protection of the public body awarding the contract. Comprehensive information about Idaho Performance Bonds Statute can be found at <http://www3.state.id.us/cgi-bin/newidst?sctid=540190026.K> (28).

Illinois Department of Transportation requires that the performance bond must be for the entire amount of the contract and issued by a firm authorized for the underwriting of at least that amount. It is possible to utilize more than one surety to bond a contract (29).

Iowa Department of Transportation Standard Specifications, Series 2009 General Requirements and Covenants Subsection 1103.05 Requirement of Contract Bond specifies that

on all contracts, the Contractor shall file an acceptable bond in an amount no less than 100% of the contract sum with the Contracting Authority; however, the amount of the contract bond does not need to include the predetermined costs for incentives or bonuses shown on the contract (30).

Kansas Department of Transportation 2007 Standard Specifications General Clauses and Covenants Section 103 Award and Execution of Contract Subsection 103.3 Contract Bond Requirements specifies to provide a contract bond on D. O. T. Form 282, for contract performance and payment of labor, materials, supplies and other items as specified in D.O. T. Form 282. Secure a penal sum that equals the contract amount (31).

Maine Department of Transportation Standard Specifications General Conditions Subsection 103.5.1 Performance and Payment Bonds complying with Section 110.2.1 – Bonds which specifies that the Contractor shall provide signed, valid, and enforceable Performance and Payments Bonds complying with the Contract. The bonds shall each be in the full Contract amount (32).

Michigan Department of Transportation 2003 Standard Specifications Subsection 102.16 Requirements of Contract Bond specifies that the determined lowest Bidder shall furnish performance and lien bonds each for not less than 100 percent of the total contract price (33).

Minnesota Department of Transportation 2005 Standard Specifications General Requirements and Covenants Subsection 1305 Requirement of Contract Bond (section 1103 Definition states that the contract bond is the approved form security executed by the Contractor and Surety or Sureties, guaranteeing complete execution of the Contract and all Supplemental Agreements pertaining thereto and the payment of all legal debts pertaining to construction of the project) specifies that the successful bidder shall furnish a payment bond equal to Contract amount as required by MN Statute §574.26 (34) which states that except as provided in sections

574.263 and 574.264 or if the amount of the contract is \$75, 000 or less, a contract with a public body for the doing of any public work is not valid unless the contractor gives a performance bond to the public body with whom the contractor entered into contract, for the use and benefit of the public body to complete the contract according to its terms, and conditioned on saving the public body harmless from all costs and charges that may accrue on account of completing the specified work. The penalty of each bond must not be less than the contract price (35).

Mississippi Department of Transportation Standard Specifications General Provisions
Section 103 Award and Execution of Contract Subsection 103.05 Requirement of Contract Bond specifies that the successful bidder shall execute and deliver to the Executive Director a contract bond or bonds in a sum equal to the full amount of the contract (36).

Montana Department of Transportation Standard Specifications Division 100 Section 103
Award and Execution of Contract Subsection 103.06 Contract Bonds specifies an executed contract bond or bonds in a sum equal to the contract amount (37).

New Jersey Department of Transportation Standard Specifications General Provisions
Award and Execution of Contract Subsection 103.05 Performance Bond and Payment Bond specifies that the Bidder to whom the Contract has been awarded shall complete and deliver a Performance Bond and a Payment Bond on forms furnished by the Department. Each bond shall be the sum of not less than the Total Contract Price less the lump sum bid for the Pay Item “Performance Bond and Payment Bond” and shall be maintained by the Contractor until Acceptance (38).

A New Mexico Department of Transportation Standard Specifications General Provisions
Section 103 Award and Execution of Contract Subsection 103.6 Requirement of Contract Bonds specifies the value of each bond shall equal the Total Original Contract Amount (39).

New York Department of Transportation Standard Specifications General Provisions
Section 103 Contract Award and Execution Subsection 103-03 Contract Bonds A Faithful
Performance Bond specifies that the Contractor shall provide a bond in the form prescribed by
the Commissioner, shown in §103-07 Sample Form of Faithful Performance Bond, with
sufficient sureties, approved by the said Commissioner, guaranteeing that the Contractor will
perform the work in accordance with the terms of the contract documents, and that it will
commence and complete the work within the time prescribed in the contract, and that it will
provide against direct or indirect damages that shall be suffered or claimed on account of such
construction or improvement, during the time thereof, until the contract is accepted. The amount
of the Faithful Performance Bond shall be 100% of the amount of the total contract bid price
(40).

Ohio Department of Transportation Standard Specifications General Provisions Section
103 Contract Award and Execution of Contract Subsection 103.05 Requirement of Contract
Bond specifies furnishing Contract Bonds within 10 days after receiving notice of award. Furnish
Contract Bonds to the Director on the prescribed form, in the amount of the Department's
estimate, and according to ORC 5525.16 (41) Contract Performance Bond and Payment Bond A
states that before entering into a contract, the director of transportation shall require a contract
performance bond and a payment bond with sufficient sureties, as follows: a contract performance
bond in an amount equal to one hundred per cent of the estimated cost of the work, conditioned,
among other things, that the contractor will perform the work upon the terms proposed, within
the time prescribed, and in accordance with the plans and specifications (42).

South Carolina Department of Transportation Standard Specifications General Provisions
Section 103 Contract Award and Execution of Contract Subsection 103.5 Bond Requirements

specifies that unless otherwise specified, provide the following bonds acceptable to the Department with the executed Contract: Performance and Indemnity Bond from a surety or sureties satisfactory to the Department in the full amount (100%) of the Contract bid amount, but in no case less than \$10, 000.00 for the protection of the Department (43).

South Dakota Department of Transportation 2004 Standard Specifications General Provisions Section 3 Award and Execution of Contract specifies that, at the time of the execution of the contract, the successful bidder shall furnish a surety bond or bonds in a sum equal to the amount of the contract (44).

Texas Department of Transportation Standard Specifications General Requirements and Covenants Section 3 Award and Execution of Contract Subsection 3.4 Execution of Contract B Bonds specify executed performance bond and payment bond in the full amount of the Contract price with powers of attorney (45).

Washington Department of Transportation Standard Specifications General Requirements Section 1-03 Award and Execution of Contract Subsection 1-03.4 Contract Bond specifies that the successful bidder shall provide an executed Contract Bond for the full Contract amount (46).

West Virginia Department of Transportation Standard Specifications General Requirements Section 103 Award and Execution of Contract Subsection 103.5 Requirement of Contract Bond specifies that the successful bidder shall execute and deliver the Division a good and sufficient surety or collateral bond payable to the State of West Virginia in the amount of 100 percent of the contract price (47).

Wisconsin Department of Transportation Standard Specifications General Requirements and Covenants Section 103 Award and Execution of Contract Subsection 103.5 Contract Bond specifies that at the time of submitting the contract for execution by the department, deposit a

valid surety bond with the department in the amount designated on the bond form covering both performance and payment. Submit the contract bond on a department-furnished form (48).

Wyoming Department of Transportation Standard Specifications General Requirements
Section 103 Award and Execution of Contract Subsection 103.5 Performance Bond103.5.1
General specifies that when the contract is executed, the department will require the successful bidder to provide a performance bond in a sum equal to the full amount of the contract (49).

REFERENCES

1. Minchin Jr., R. E. and Smith, G. R. *Quality-Based Performance Rating of Contractors Prequalification and Bidding Purposes*, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w38.pdf. Transportation Research Board. Accessed date July, 2009.
2. American Bar Association. *The Law of Performance Bonds*. 2009, 2nd Edition, pp. 3-5, 22.
3. Luckey, J. and Allman, A. *Overview of the Miller Act Subcontractor Protection in Federal Projects*, <http://stuff.mit.edu/afs/sipb.mit.edu/contrib/wikileaks-crs/wikileaks-crs-reports/97-751.pdf>. United States Congressional Research Service, American Law Division. Accessed date is November, 2009
4. American Bar Association. *The Law of Performance Bonds*. 1999, 1st Edition, pp. 3, 7.
5. United States Congress House Committee on the Judiciary. *Amending the Act of April 29, 1941, to authorize the waiving of the requirement of performance and payment bonds in connection with certain contracts entered into by the Secretary of Commerce*. 1970.
6. United States General Accountability Office. *Federal Contractors: Better Performance Information Needed to Support Agency Contract Award Decisions*, <http://www.gao.gov/new.items/d09374.pdf>. Accessed date August, 2009.
7. Gransberg, D. and Reimer, C. *NCHRP Synthesis 390: Performance-Base Contractor Prequalification*, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_390.pdf. Transportation Research Board. Accessed date July, 2009.
8. Wisconsin Department of Transportation. *Transportation Synthesis Report: Contractor Prequalification Quality-Based Rating*, <http://on.dot.wi.gov/wisdotresearch/database/tsrs/tsrcontractorprequalification.pdf>. Accessed date July, 2009.
9. Thomas, H and Smith, G. *NCHRP Synthesis 190: Criteria for Qualifying Contractors for Bidding Purposes*, http://books.google.com/books?id=zG-SwPbizbwC&pg=PA19&lpg=PA19&dq=surety+and+dots+require+performance+bonds&source=bl&ots=-pBILQ2yG4&sig=TVC9hUdUWHWoDAqaKdrwWMidA-U&hl=en&ei=0PTwSpC1CcXQ8QazwsD0CA&sa=X&oi=book_result&ct=result&resnum=1&ved=0CBAQ6AEwAA#v=onepage&q=surety%20and%20dots%20require%20performance%20bonds&f=false. Transportation Research Board. Accessed date November, 2009.
10. The Surety and Fidelity Association of America. *Ohio HB 1 – The State Budget Hurts Small and Emerging Contractors and Puts State Taxpayers and Laborers at Risk*, <http://www.surety.org/GovRel/OhioHB1.pdf>. Accessed date October, 2009.
11. Surety Information Office. *State Bonds Thresholds*, <http://www.surety.org/GovRel/StateBondThresholds.pdf>. The Surety and Fidelity Association of America. Accessed date October, 2009.

12. Associated Insurance Agency. *The Importance of Surety Bonds in Construction*, <http://www.aiabonds.com/Misc/Default.aspx?EditId=65&ParentId=61>. Accessed date November, 2009.
13. Surety Information Office. *Contract Surety Bonds: Protecting Your Investment*, <http://www.sio.org/html/protectinvest.html>. Accessed date October, 2009.
14. Surety Information Office. *2007 Surety Market Report: Rising to the Occasion*, http://www.sio.org/pdf/ENR_Market_2007.pdf. Accessed date October, 2009.
15. Associated Builders and Contractors. *2008 Surety Market Overview: The Value of Surety in Today's Challenging Construction Economy*, http://www.constructionexec.com/Issues/November_2008/Features2.aspx. Accessed date October, 2009.
16. Alabama Department of Transportation. *Standard Specifications for Highway Construction*, http://www.dot.state.al.us/NR/rdonlyres/93B6BE77-D8B5-489B-AA00-DCA0731ADB87/0/2008_ALDOT_Spec_Book.pdf. Accessed date November, 2009.
17. Alaska Department of Transportation and Public Facilities. *Standard Specifications for Highway Construction*, <http://www.dot.state.ak.us/stwddes/dcspsecs/assets/pdf/hwyspecs/english/2004sshc.pdf>. Accessed date November, 2009.
18. Touch N' Go/Bright Solutions Inc. *Alaska Legal Resource Center: AS 36.25.010. Bonds of Contractors For Public Buildings or Works*, <http://touchngo.com/lglcntr/akstats/STATUTES/Title36/Chapter25/Section010.htm>. Accessed date November, 2009.
19. Arizona Department of Transportation. *Standard Specifications for Road and Bridge Construction*, <http://www.azdot.gov/Highways/ConstGrp/contractors/PDF/2008StandardSpecifications.pdf>. Accessed date November, 2009.
20. Arkansas State Highway and Transportation Department. *Arkansas 2003 Standard Specification for Highway Construction*, http://www.arkansashighways.com/standard_spec/2003/final100.pdf. Accessed date November, 2009.
21. California Department of Transportation. *Standard Specifications for Road and Bridge Construction*, http://www.dot.ca.gov/ctjournal/images/2006_StdSpecs.pdf. Accessed date November, 2009.
22. Colorado Department of Transportation. *Standard Specifications for Road and Bridge Construction*, <http://www.dot.state.co.us/DesignSupport/Construction/2005SpecsBook/2005Book/2005SpecBookWhole.pdf>. Accessed date November, 2009.

23. Connecticut Department of Transportation. *Standard Specifications for Roads, Bridges and Incidental Construction*, http://www.conndot.ct.gov/816/section_1.03.htm. Accessed date November, 2009.
24. State of Connecticut General Assembly. *Statutes*, <http://www.cga.ct.gov/2009/pub/chap847.htm#Sec49-41.htm>. Accessed date November, 2009.
25. Delaware Department of Transportation. *Standard Specifications for Road and Bridge Construction*, http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml. Accessed date November, 2009.
26. Georgia Department of Transportation. *Standard Specifications for Construction of Transportation Systems*, <http://tomcat2.dot.state.ga.us/ContractsAdministration/uploads/DOT%202001.pdf>. Accessed date November, 2009.
27. Hawaii Transportation Department. *DOT/FEDERAL Projects Special Provisions for 2005 Standard Specifications*, http://plonedev.hawaii.gov/dot/highways/specifications2005/provisions/projectspprov/sp_fed.htm. Accessed date November, 2009.
28. Idaho Transportation Department. *Standard Specifications for Highway Construction - 2004*, <http://itd.idaho.gov/manuals/Downloads/spec%2704%27.htm>. Accessed date November, 2009.
29. Illinois Department of Transportation. *Letting You Know*, <http://www.dot.state.il.us/desenv/012006/nllyk.pdf>. Accessed date November, 2009.
30. Iowa Department of Transportation. *Standard Specifications, Series 2009*, <http://www.iowadot.gov/erl/current/GS/content/1103.pdf>. Accessed date November, 2009.
31. Kansas Department of Transportation. *2007 Standard Specifications for Road and Bridge Construction*, <http://www.ksdot.org/burconsmain/specprov/2007SSDefault.asp>. Accessed date November, 2009.
32. Maine Department of Transportation. *Standard Specifications – Revision of December 2002*, http://www.maine.gov/mdot/contractor-consultant-information/ss_standard_specification_2002.php. Accessed date November, 2009.
33. Michigan Department of Transportation. *The 2003 Standard Specifications for Construction*, <http://mdotwas1.mdot.state.mi.us/public/specbook/>. Accessed date November, 2009.
34. Minnesota Department of Transportation. *Mn/DOT Standard Specifications for Construction: 2005 Spec Book Edition*, <http://www.dot.state.mn.us/pre-letting/spec/index.html>. Accessed date November, 2009.

35. Minnesota Office of the Revisor of Statutes. *2009 Minnesota Statutes: 574.26 Contractors' Bonds for Public Work*, <https://www.revisor.mn.gov/statutes/?id=574.26&year=2009>. Accessed date November, 2009.
36. Mississippi Department of Transportation. *Standard Specifications for Road and Bridge Construction*, <http://www.gomdot.com/Divisions/Highways/Resources/Construction/pdf/2004StandardSpecs/specbook.pdf>. Accessed date November, 2009.
37. Montana Department of Transportation. *2006 Standard Specifications*, http://www.mdt.mt.gov/business/contracting/standard_specs.shtml. Accessed date November, 2009.
38. New Jersey Department of Transportation. *Standard Specifications for Road and Bridge Construction*, http://www.state.nj.us/transportation/eng/specs/english/EnglishStandardSpecifications.htm#_Toc530372331. Access date is November, 2009.
39. New Mexico Department of Transportation. *Standard Specifications for Highway and Bridge Construction*, http://www.nmshtd.state.nm.us/upload/images/Contracts_Unit/2007_Specs_for_Highway_and_Bridge_Construction.pdf. Accessed date November, 2009.
40. New York Department of Transportation. *Standard Specifications (U.S. Customary Units)*, <https://www.nysdot.gov/main/business-center/engineering/specifications/english-spec-repository/espec-english-cd.pdf>. Accessed date November, 2009.
41. Ohio Department of Transportation. *2005 Construction and Material Specifications*, http://www2.dot.state.oh.us/construction/OCA/Specs/2005CMS/2005_ODOT_C&MS.htm. Accessed date November, 2009.
42. Lawriter LLC. *5525.16 Contract Performance Bond and Payment Bond*, <http://codes.ohio.gov/orc/5525.16>. Accessed date November, 2009.
43. South Carolina Department of Transportation. *2007 Standard Specifications for Highway Construction*, http://www.scdot.org/doing/StandardSpecifications/pdfs/2007_full_specbook.pdf. Accessed date November, 2009.
44. South Dakota Department of Transportation. *2004 Standard Specifications for Roads and Bridges Construction*, <http://www.sddot.com/operations/docs/specbook04/3.pdf>. Accessed date November, 2009.
45. Texas Department of Transportation. *Standard Specifications for Construction of Highways, Streets and Bridges*, <ftp://ftp.dot.state.tx.us/pub/txdot-info/des/specs/specbook.pdf>. Accessed date November, 2009.

46. Washington Department of Transportation. *Standard Specifications for Road, Bridge and Municipal Construction 2010*, <http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS2010.pdf>. Accessed date November, 2009.
47. West Virginia Division of Highways. *Standard Specifications for Roads and Bridges*, <http://www.wvdot.com/engineering/Specifications/2003/Y2KSpecB.pdf>. West Virginia Department of Transportation. Accessed date November, 2009.
48. Wisconsin Department of Transportation. *2010 Standard Specifications*, <http://roadwaystandards.dot.wi.gov/standards/stndspec/index.htm>. Accessed date November, 2009.
49. Wyoming Department of Transportation. *Standard Specifications for Road and Bridge Construction - 2004*, http://www.dot.state.wy.us/webdav/site/wydot/shared/Construction/2003%20Spec%20Book/Standard_Specifications_for_Road_and_Bridge_Construction.pdf. Accessed date November, 2009.

BIOGRAPHICAL SKETCH

In 1982, Lorena Ofelia Myers was born in Punta Gorda Town, Belize. In 2001, she earned her Associates Degree in Physics and Math from St. John's College Junior College. She did a year of voluntary work from 2001 – 2002 and taught at Toledo Community College, in Punta Gorda Town, Belize from 2002 - 2003. She embarked, in 2003, on her Bachelor of Science in Civil Engineering from the University of New Mexico where she earned it in 2003. While pursuing her bachelor degree, she became an invited member of both the Kappa Mu Epsilon National Mathematics Honor Society and Chi Epsilon Civil Engineering Honor Society. In 2007, she became an engineering intern after passing the FE.

In February 2007, she was hired by Brasher and Lorenz, Inc. as a Staff Engineer where she worked as a design engineer. She worked with the civil engineering consulting firm for a year. In 2008, she began pursuing her Master of Engineering degree. Upon completion of the degree, Lorena is hoping to continue working as a design engineer. She married a chemist, Dr. William Myers, in December 2008.